

## PROJECT-BASED LEARNING: DESIGN AND BUILD A RAIN GARDEN

### Part 2: Site Investigation and Inventory

#### Activity C - Draft the Base Map and Garden Layout

In this activity, you will create the most accurate drawing you can in order to have an adequate foundation from which to develop your garden design and planting plan. Make sure to find out whether you need to draw your map to scale.

Materials:

- 11"x17" blank paper
- Architectural scale (if drawing to scale)
- T-square
- Drafting triangles
- Drafting dots or drafting tape (masking tape will suffice)
- Circle template
- Colored pens and pencils
- Calculator

#### Drawing to Scale

As a class you will determine the appropriate scale to use for the base map. The best scales are  $\frac{1}{8}$  in,  $\frac{1}{4}$  in or  $\frac{1}{2}$  in for a site plan, listed in order of increasing scale. The larger the scale, the bigger and clearer the information will appear, but the scale needs to be able to incorporate the entire site on the size paper you're using.

Example: When you look at your architectural scale, you will see the numbered markings that correspond to each listed scale size and these represent numbers of feet in the field.

Using a  $\frac{1}{4}$  in scale means that when you translate your field measurements onto paper, every foot in the field equals  $\frac{1}{4}$  in on paper ( $\frac{1}{4}$ " = 1' -0"). So, if a building is 40 ft wide by 40 ft long in the field, the measurement on paper will be 10 in by 10 in ( $\frac{1}{4}$  of 40 = 10).

Using a  $\frac{1}{8}$  in scale, every foot in the field equals  $\frac{1}{8}$  in on paper ( $\frac{1}{8}$ " = 1' -0"). The same measurement in the field, 40 ft x 40 ft, will be 5 in by 5 in ( $\frac{1}{8}$  of 40 = 5). The measurements on the scale are helpful because they save you from having to do the translation math repeatedly.

Step 1: Determine the longest distance across the site based on your field measurements.

Step 2: Use your architectural scale to determine the largest possible scale that will fit on your base map paper.

**Write the scale that the class has agreed to use: \_\_\_\_\_ = 1' -0"**

## Directions

### A. Draft the Base Map

1. Tape your blank 11 in x17 in paper onto a table with at least 3 inches of space between the edge of your paper and the edge of the table. Make sure that when you fix your paper to the table, its edges are parallel to the edges of the table. Use a T-square and drafting triangles to determine this.
2. Using the measurements you obtained in the field, start by drawing the outlines or boundaries of the site, as much as you are able (e.g., fence lines, paving edges, building faces, etc.).
3. After the broad outline of your site has been drawn, fill in the more detailed information, including
  - a. Locations of irregular or non-perpendicular element
  - b. Paths, site walls, etc.
  - c. Drains, utilities, telephone poles
  - d. Existing vegetation, especially important trees to be protected in place.
  - e. Drainage patterns & sources of stormwater
  - f. Areas of the site characterized by shade or full sun

## B. Draw the Garden Layout

Designing the size, shape and position of the rain garden is also called designing the layout. The layout of the garden will be affected by several issues: Where the water is coming from, the size and shape of the area you have available to store the water and, finally, where you want the water to end up. There is no exact formula or template for designing a rain garden layout because each site is different and no two rain gardens are the same.

Earlier, you calculated the optimal size for the rain garden. You also designed a square-shaped, single basin rain garden and one example of a multiple basin rain garden. Now it's time to add these designs to your map. Designing a single basin: You'll use tracing paper to test out your ideas before committing to a final plan.

### Designing a single basin:

1. Tape a piece of tracing paper to the table and draw a square the size of your rain garden's storage area as calculated earlier.
2. Peel up your tracing paper with the square on it and tape down the base map in its place. Make sure the base map is about 2-4 inches from the edges of the table and parallel to the table edges by using your T-square and drafting triangles.
3. Identify the location the stormwater will come *from* - this could be a roof downspout, some other pipe, or a parking lot curb cut, for example. This is probably located at one of the higher points on your site.
4. Identify the location where the stormwater should overflow *to* if your rain garden is overwhelmed with stormwater during a storm that exceeds the 1 inch we have designed for. This point must be lower in elevation than the source of the water, since water will only run downhill, never up.
5. Position the square rain garden outline on the tracing paper over your base map, somewhere between the incoming water and the outlet. Make sure that the proposed rain garden location does not conflict with any important site features such as like existing pavement that cannot be removed, such as seating, doorways, or underground utilities. The tracing paper allows you to move the location around on the base map and still see the other information (including constraints) written on the base map beneath it.
6. Once you have found the perfect location for your rain garden, tape the tracing paper down to your base map.
7. The square shape is only intended to serve as a guideline for the approximate size of the rain garden, but gardens are often more attractive when they have a more organic (curvilinear) shape. Tape a fresh piece of tracing paper over the top of both the square and base map and use the square as a guide to draw an organic rain garden shape. Keep in mind, the organic shape must

be at least as large as the square; it can be bigger, but not smaller—the garden can have the capacity to store more rainwater than it will receive during a design storm, but it cannot store less.

8. Make sure you clearly indicate the inlet (location where the source of water comes from) and the outlet (location where the overflow of excess water runs). Note that the outlet will be a slight depression in the berm that retains your stormwater “pond” so that if the basin overflows, it will run out of the overflow outlet.

#### Process B - Designing multiple basins:

1. The process of designing multiple basins is very similar to designing a single basin. The first thing you need to do is draw your rectangular template shapes on pieces of tracing paper. It does not matter how large or numerous they are, so long as they add up to the same area as the single rectangular shape.
2. Now, position the tracing paper shapes you drew around your base map until you have a layout that you like. Make sure that you carefully determine the sequence that the rain gardens will fill—each rain garden must be placed lower on the site than the garden that precedes and fills it with overflow.
3. Once you have an agreeable layout of your rain garden shapes taped to the base map, take a fresh sheet of tracing paper and place it on top of your drawing and sketch out more attractive, organic shapes for all of your individual rain gardens. Use the squares as guides to draw these organic shapes. Keep in mind, the organic shapes must be at least as large as the original squares; they can be bigger, but not smaller—the garden can have the capacity to store more rainwater than it will receive during a design storm, but it cannot store less.